UCRL-JC-124437 Abs

Recent Results from the EBIT and Super EBIT at LLNL

R. E. Marrs
Lawrence Livermore National Laboratory
Livermore, CA 94551, USA

The electron beam ion trap (EBIT), and the higher-energy Super EBIT at Lawrence Livermore National Laboratory can produce any highly charged ion. These highly charged ions are used in several different research programs, including electron-ion collision cross sections, spectroscopic measurements of atomic structure, ion retrapping and cooling, and ion-surface interactions. Recently, the Super EBIT has been used to measure L-shell and K-shell ionization cross sections for the series of uranium ions from U^{83+} to U^{91+}. A recent Super-EBIT measurement of the ground-state hyperfine transition in hydrogenlike $^{165}Ho^{66+}$ is especially significant because of the complete absence of Doppler shifts.

A cryogenic Penning trap, injected with ions from EBIT and dubbed RETRAP, has been used to observe a single highly charged ion as it recombines by sequential electron capture from neutral hydrogen molecules. Recent results in ion-surface collisions include the observation of large efficiencies for sputtered ions and secondary electron emission.

This work was performed under the auspices of the U. S. Department of Energy by the Lawrence Livermore National Laboratory under contract W-7405-ENG-48.